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FULWIDER PATTON LEE & UTECHT, LLP
Howard Hughes Center
6060 Center Drive,
Tenth Floor
Los Angeles, CA 90045

EXAMINER
BURD, KEVIN MICHAEL

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

KS

	Application No.	Applicant(s)
Office Action Summary	09/687,024	LINDSEY ET AL.
	Examiner	Art Unit
	Kevin M Burd	2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

- A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
  - Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  - Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _10/13/2000_ .

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-74_ is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-74_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on _13 October 2000_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All b) ☐ Some * c) ☐ None of:

   1. ☐ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

Drawings

1.   The drawings are objected to under 37 CFR 1.83(a). The drawings must show

every feature of the invention specified in the claims. Therefore, the plurality of

integrators and the plurality of squaring stages must be shown or the features canceled

from the claims. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the

Office action to avoid abandonment of the application. The objection to the drawings

will not be held in abeyance.

Specification

2.   Applicant is reminded of the proper language and format for an abstract of the
disclosure.

The abstract should be in narrative form and generally limited to a single
paragraph on a separate sheet within the range of 50 to 150 words. It is important that
the abstract not exceed 150 words in length since the space provided for the abstract
on the computer tape used by the printer is limited. The form and legal phraseology
often used in patent claims, such as "means" and "said," should be avoided. The
abstract should describe the disclosure sufficiently to assist readers in deciding whether
there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information
given in the title. It should avoid using phrases which can be implied, such as, "The
disclosure concerns," "The disclosure defined by this invention," "The disclosure
describes," etc.

Claim Objections

3.   Claims 6-11, 14-16, 21-24, 26-32, 3437, 39, 40, 42-44, 47-63, 67-70, and 74 are

objected to because of the following informalities: the terms "N" and "M" are undefined.

It is unclear if these variables are integers, for what range of numbers these terms are valid, etc. Appropriate correction is required.

4.   Claims 43-50 are objected to because of the following informalities: on line 1, the phrase "In combination in apparatus for transmitting..." is recited. This phrase is confusing. It is unclear what combination is being claimed since there is only one apparatus. Appropriate correction or clarification is required. Claim 45 is objected to. Line 1 contains the phrase "s". This term should be "as".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5.   Claims 1-18, 21, 29-34, 43, 44, 47, 49, 51, 54-57 and 59 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al (US 5,781,542).

Regarding claims 1 and 55, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively

modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claims 2 and 56, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claim 3, this modulated and spread signal is transmitted (figure 2).

Regarding claim 4, the modulation types that are selected are BPSK, QPSK, 8PSK and 16PSK (column 5, lines 7-12) and 16 different spread codes are provided.

Regarding claim 5, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claim 6, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). An input is provided to a dividing section and an encoding section shown on figure 2. The sequence of symbols is input to a modulation section. A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations (M) is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes (N) are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claim 7, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claim 8, this modulated and spread signal is transmitted (figure 2).

Regarding claims 9 and 10, a parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. The sequence is selectively modulated and spread.

Regarding claim 11, the modulation types that are selected are BPSK, QPSK, 8PSK and 16PSK (column 5, lines 7-12) and 16 different spread codes are provided.

Regarding claim 12, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). An input is provided to a dividing section and an encoding section shown on figure 2. The sequence of symbols is input to a modulation section. A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations (M) is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes (N) are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claim 13, each of the parallel paths selects a modulation and a spreading code and this modulated, spread data sequence is transmitted (column 4, lines 5-28).

Regarding claims 14, 29 and 33, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). An input is provided to a dividing section and an encoding section shown on figure 2. The sequence of symbols is input to a

modulation section. A plurality of types of multi-valued modulation systems having

different numbers of multi-valued modulations (M) is determined (column 2, lines 29-

32). A number of different spreading codes from a plurality of spreading codes (N) are

determined (column 2, lines 35-41). A parallel presentation of the individual sequence to

be modulated and spread is shown in figure 2. Each signal is selectively modulated

(column 5, lines 7-12) and then spread using one of the spreading codes (column 11,

lines 50-52). Each spreading code is unique for every user.

Regarding claims 15 and 30, each sequences is modulated by one of the

modulations and then spread by one of the spreading codes (column 2, lines 21-41 and

figure 2).

Regarding claim 16, Tanaka further discloses a receiver stage as shown in figure

2. The receiver divides the signal into m pieces. The signals are despread (column 4,

lines 28-37). After dispreading, the signal is demodulated using the previously selected -

modulation type (column 4, lines 37-42).

Regarding claims 17 and 31, the data is demodulated using the appropriate

demodulation type (column 4, lines 37-42).

Regarding claims 18 and 32, the data is despread using the appropriate

despreading code (column 4, lines 32-37).

Regarding claim 21, Tanaka discloses a method of transmitting data from a

transmitter to a receiver (figure 2). An input is provided to a dividing section and an

encoding section shown on figure 2. The sequence of symbols is input to a modulation

section. A plurality of types of multi-valued modulation systems having different

numbers of multi-valued modulations (M) is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes (N) are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user. Tanaka further discloses a receiver stage as shown in figure 2. The receiver divides the signal into m pieces. The signals are despread (column 4, lines 28-37). After dispreading, the signal is demodulated using the previously selected -modulation type (column 4, lines 37-42).

Regarding claim 34, the data is encoded at the transmitter and decoded at the receiver as shown in figure 2. The controller 20 ensures the data is decoded properly (figure 2).

Regarding claims 43, 51 and 54, Tanaka discloses an apparatus for transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user. The modulated and spread signal is transmitted as shown in figure 2.

Regarding claim 44, an encoder for encoding the input data is shown in figure 2.

Regarding claims 47 and 49, one of the plurality of data modulations are used on each signal as is one of a plurality of spreading codes as stated above. The controller 20 controls which data modulation and spreading code.

Regarding claim 57, the combined modulated and spread signal is transmitted as shown in figure 2.

Regarding claim 59, the input signal is encoded as shown in figure 2.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 19, 20 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Fulghum (US 5,345,469).

Regarding claims 19, 20, 22 and 23, Tanaka discloses the method stated above in paragraph 5. Tanaka discloses the signal is despread and demodulated when identified by the controller 20. Tanaka does not disclose identifying the spreading code by correlating the received signal. Fulghum discloses using adaptable matched filters to provide a correlation to determine which of the spreading codes is the most optimum to use. This determines which is in use (column 3, line 63 to column 4, line 16). The use of matched filters is well known in CDMA systems (column 3, lines 64-65). They are easy and inexpensive to implement and for these reasons, it would have been obvious for

one of ordinary skill in the art at the time of the invention to use the matched filter

correlation system of Fulghum in the method of Tanaka.

Regarding claim 24, Fulghum discloses the output of the adaptable matched

filters is squared and integrated as shown in figure 2.

7.   Claims 25-28, 41 and 42 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Park (US 6,160,840) in view of Tanaka et al (US 5,781,542).

Regarding claim 25, Park discloses a method of transmitting data shown in figure

1. The input signal is encoded (111), punctured (115), modulated (121) and spread

(119). This output data is then transmitted (column 1, lines 38-48 and line 66 to column

2, line 4). Park does not disclose modulating the interleaved data then spreading the

signal prior to transmission. Tanaka discloses modulating the data using one of a

plurality of data modulations prior to using one of a plurality of spreading codes (column

2, lines 29-41). The method of Tanaka allows an information system to transmit

information at high speeds with high quality even when spread codes of necessary

number cannot be obtained (column 2, lines 16-20). For this reason, it would have been

obvious for one of ordinary skill in the art at the time of the invention to utilize the

method of transmitting data of Tanaka in the method of Park.

Regarding claims 26 and 28, Tanaka further discloses plurality of types of multi-

valued modulation systems having different numbers of multi-valued modulations is

determined (column 2, lines 29-32). A number of different spreading codes from a

plurality of spreading codes are determined (column 2, lines 35-41). A parallel

presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claim 27, each sequences is modulated by one of the data modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claim 41, Park discloses a method of receiving transmitted data as shown in figure 2. The RDATA signal is despread (213), demodulated (211), de-interleaved (215) and de-punctured (311). This output data is then processed by down stream elements (column 2, lines 5-31). Park does not disclose despreading the received signal prior to demodulation. Tanaka discloses dispreading the data using one of a plurality of dispreading codes prior to using one of a plurality of demodulation codes (column 4, lines 28-51). The method of Tanaka allows an information system to transmit information at high speeds with high quality even when spread codes of necessary number cannot be obtained (column 2, lines 16-20). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to utilize the method of receiving and processing data of Tanaka in the method of Park.

Regarding claim 42, the controller 20 identifies which of the dispreading codes to apply to the received signal and which of the data demodulations to use to demodulate the despread signal (column 4, lines 28-51).

8.   Claims 35-40, 45, 46, 48, 50, 52, 53, 58 and 60 are rejected under 35 U.S.C.

103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Park (US

6,160,840).

Regarding claim 35, Tanaka discloses the method stated above in paragraph 5.

Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure

1, puncturing the data prior to transmission. By puncturing the data signal, a secondary

data signal can be input to the primary signal. This signal can later be recovered and

the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill

in the art at the time of the invention to incorporate the data puncturing method of Park

into the method of Tanaka. The punctured data cause a receiver to correct for errors

and recover the data in its original form to obtain a desired symbol rate (column 1, lines

23-38).

Regarding claim 36, Tanaka discloses the method stated above in paragraph 5.

Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure

1, puncturing the data prior to transmission. The signal is de-punctured in the receiver

(figure 2). By puncturing the data signal, a secondary data signal can be input to the

primary signal. This signal can later be recovered at the receiver (column 1, lines 14-

38). It would have been obvious for one of ordinary skill in the art at the time of the

invention to incorporate the data puncturing method of Park into the method of Tanaka.

The punctured data cause a receiver to correct for errors and recover the data in its

original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 37, Tanaka discloses the method stated above in paragraph 5. Tanaka does not disclose puncturing the data at the transmitter or de-puncturing the data after demodulation and dispreading has occurred. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing method of Park into the method of Tanaka after dispreading and demodulation has occurred. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 38, Tanaka discloses the method stated above in paragraph 5. Tanaka does not disclose puncturing and interleaving the data at the transmitter. Park discloses in figure 1, puncturing and interleaving the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing and interleaving the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing and interleaving method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 39, Tanaka discloses the method stated above in paragraph 5.
Tanaka does not disclose puncturing and interleaving the data at the transmitter. Park
discloses in figure 1, puncturing and interleaving the data prior to transmission. The
signal is de-punctured in the receiver (figure 2). By puncturing and interleaving the data
signal, information can be removed from the signal. This information can later be
recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of
ordinary skill in the art at the time of the invention to incorporate the data puncturing and
interleaving method of Park into the method of Tanaka. The punctured data cause a
receiver to correct for errors and recover the data in its original form to obtain a desired
symbol rate (column 1, lines 23-38).

Regarding claim 40, Tanaka discloses dispreading the received data according
to one of the plurality of spreading codes and demodulating according to one of the data
modulations (column 4, lines 28-51) to recover the original signal.

Regarding claims 45, 48 and 53, Tanaka discloses the method stated above in
paragraph 5. Tanaka does not disclose interleaving the data at the transmitter. Park
discloses in figure 1, interleaving the data prior to transmission. By interleaving the data
signal, the order of the signal can be changed. If an error were to occur, instead of
consecutive symbols being affected, non-consecutive information would be corrupted
allowing data correction to have a chance of recovering the original data. It would have
been obvious for one of ordinary skill in the art at the time of the invention to incorporate
the data interleaving method of Park into the method of Tanaka for the reason stated
above.

Regarding claim 46, Tanaka discloses the method stated above in paragraph 5. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing the data prior to transmission. By puncturing the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered and the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 50, Tanaka discloses the method stated above in paragraph 5. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing and interleaving the data prior to transmission. By puncturing and interleaving the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered and the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing and interleaving method of Park into the method of Tanaka. The punctured and interleaved data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claims 52, 58 and 60, Tanaka discloses the method stated above in paragraph 5. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-

punctured in the receiver (figure 2). By puncturing the data signal, information can be

removed from the signal. This information can later be recovered at the receiver

(column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at

the time of the invention to incorporate the data puncturing method of Park into the

method of Tanaka. The punctured data cause a receiver to correct for errors and

recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-

38).

9.   Claims 61-63 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868).

Regarding claim 61, Tanaka discloses an apparatus for transmitting data from a

transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation

systems having different numbers of multi-valued modulations is determined (column 2,

lines 29-32). A number of different spreading codes from a plurality of spreading codes

are determined (column 2, lines 35-41). A parallel presentation of the individual

sequence to be modulated and spread is shown in figure 2. Each signal is selectively

modulated (column 5, lines 7-12) and then spread using one of the spreading codes

(column 11, lines 50-52). Each spreading code is unique for every user. Tanaka does

not disclose using a plurality of matched filters to correlate the received signal.

Lee discloses using a plurality of matched filters to determine if one of the

outputs of the matched filters has a value higher than a critical value (column 1, lines

24-40). This comparison is done in the decision unit 12 shown in figure 1. This process

reduces the average acquisition time as compared to serial acquisition systems

9column 1, lines 36-40). For this reason, it would have been obvious for one of ordinary

skill in the art at the time of the invention to combine the filter arrangement of Lee into

the apparatus of Tanaka to obtain the correct spread signal at the receiver quickly.

Regarding claim 62, Tanaka discloses the receiver despreads the signal using

the appropriate spreading code (column 4, lines 28-51).

Regarding claim 63, Tanaka discloses the receiver demodulates the signal using

the appropriate demodulation (column 4, lines 28-51).

Regarding claim 66, Tanaka discloses a decoder for decoding the received

signal (figure 2).

10.   Claims 64, 65 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868) further in view of

Park (US 6,160,840).

Regarding claim 64, the apparatus of the combination of Tanaka and Lee is

disclosed above in paragraph 9. The combination does not disclose the use of a de-

puncturer in the receiver for restoring portions of removed data. Park discloses in figure

1, puncturing the data prior to transmission. The signal is de-punctured in the receiver

(figure 2). By puncturing the data signal, information can be removed from the signal.

This information can later be recovered at the receiver (column 1, lines 14-38). It would

have been obvious for one of ordinary skill in the art at the time of the invention to

incorporate the data puncturing apparatus of Park into the apparatus of Tanaka and

Lee. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 65, the apparatus of the combination of Tanaka and Lee is disclosed above in paragraph 9. The combination does not disclose the use of a de-interleaving. Park discloses in figure 1, interleaving the data prior to transmission. By interleaving the data signal, the order of the signal can be changed. If an error were to occur, instead of consecutive symbols being affected, non-consecutive information would be corrupted allowing data correction to have a chance of recovering the original data. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data interleaving apparatus of Park into the apparatus of Tanaka and Lee for the reason stated above.

Regarding claim 67, the apparatus of the combination of Tanaka and Lee is disclosed above in paragraph 9. The combination does not disclose the use of a de-puncturer and a de-inteleaver in the receiver for restoring portions of removed data. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, information can be removed from the signal. This information can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing apparatus of Park into the apparatus of Tanaka and Lee. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38). Park, also, discloses in figure 1, interleaving the data prior to transmission. By

interleaving the data signal, the order of the signal can be changed. If an error were to occur, instead of consecutive symbols being affected, non-consecutive information would be corrupted allowing data correction to have a chance of recovering the original data. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data interleaving apparatus of Park into the apparatus of Tanaka and Lee for the reason stated above.

11.   Claims 68-70 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868) further in view of Fulghum (US 5,345,469).

Regarding claim 61, Tanaka discloses an apparatus for transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user. Tanaka does not disclose using a plurality of matched filters to correlate the received signal.

Lee discloses using a plurality of matched filters to determine if one of the outputs of the matched filters has a value higher than a critical value (column 1, lines 24-40). This comparison is done in the decision unit 12 shown in figure 1. This process

reduces the average acquisition time as compared to serial acquisition systems 9column 1, lines 36-40). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the filter arrangement of Lee into the apparatus of Tanaka to obtain the correct spread signal at the receiver quickly.

The combination of Tanaka and Lee does not disclose a plurality of integrators, a plurality of squaring stages and a comparator for determining the largest output. However, Fulghum discloses a serial matched filter arrangement where the output of each matched filter is squared and integrated (figure 2). This value is stored until all codes have been processed and the codes are compared to determine the optimum spreading code (column 3, line 63 to column 4, line 29). This serial method is time consuming. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the integrating and squaring method of Fulghum in the parallel matched filter arrangement of the combination of Tanaka and Lee to speed up the comparison to determine the optimum spreading code.

Regarding claim 69, Tanaka discloses the dispreading circuit shown in figure 2.

Regarding claim 70, Tanaka discloses the demodulator circuit shown in figure 2.

Regarding claim 73, Tanaka discloses the decoding circuit shown in figure 2.

12.   Claims 71, 72 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868) further in view of Fulghum (US 5,345,469) in view of Park (US 6,160,840).

Regarding claim 71, the apparatus of the combination of Tanaka, Lee and

Fulghum is disclosed above in paragraph 11. The combination does not disclose the

use of a de-puncturer in the receiver for restoring portions of removed data. Park

discloses in figure 1, puncturing the data prior to transmission. The signal is de-

punctured in the receiver (figure 2). By puncturing the data signal, information can be

removed from the signal. This information can later be recovered at the receiver

(column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at

the time of the invention to incorporate the data puncturing apparatus of Park into the

apparatus of Tanaka, Lee and Fulghum. The punctured data cause a receiver to correct

for errors and recover the data in its original form to obtain a desired symbol rate

(column 1, lines 23-38).

Regarding claim 72, the apparatus of the combination of Tanaka, Lee and

Fulghum is disclosed above in paragraph 11. The combination does not disclose the

use of a de-interleaving. Park discloses in figure 1, interleaving the data prior to

transmission. By interleaving the data signal, the order of the signal can be changed. If

an error were to occur, instead of consecutive symbols being affected, non-consecutive

information would be corrupted allowing data correction to have a chance of recovering

the original data. It would have been obvious for one of ordinary skill in the art at the

time of the invention to incorporate the data interleaving apparatus of Park into the

apparatus of Tanaka, Lee and Fulghum for the reason stated above.

Regarding claim 74, the apparatus of the combination of Tanaka, Lee and

Fulghum is disclosed above in paragraph 11. The combination does not disclose the

use of a de-puncturer and a de-inteleaver in the receiver for restoring portions of

removed data. Park discloses in figure 1, puncturing the data prior to transmission. The

signal is de-punctured in the receiver (figure 2). By puncturing the data signal,

information can be removed from the signal. This information can later be recovered at

the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill

in the art at the time of the invention to incorporate the data puncturing apparatus of

Park into the apparatus of Tanaka and Lee. The punctured data cause a receiver to

correct for errors and recover the data in its original form to obtain a desired symbol rate

(column 1, lines 23-38). Park, also, discloses in figure 1, interleaving the data prior to

transmission. By interleaving the data signal, the order of the signal can be changed. If

an error were to occur, instead of consecutive symbols being affected, non-consecutive

information would be corrupted allowing data correction to have a chance of recovering

the original data. It would have been obvious for one of ordinary skill in the art at the

time of the invention to incorporate the data interleaving apparatus of Park into the

apparatus of Tanaka, Lee and Fulghum for the reason stated above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Ghosh et al (US 6,366,601) discloses a spread spectrum system

that selects one of a plurality of data modulations and one of a plurality of spreading

codes (figure 1 and abstract). Bruckert et al (US 5,204,876) discloses a method of

encoding, puncturing, interleaving, modulating and spreading an input signal (figure 3).

Contact Information

Any response to this action should be mailed to:

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Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Kevin Burd, whose telephone number is (703) 308-
7034. The Examiner can normally be reached on Monday-Thursday from 9:00 AM -
6:00 PM.

Any inquiry of a general nature or relating to the status of this application should
be directed to the Group receptionist whose telephone number is (703) 305-3800.

Kevin M. Burd
PATENT EXAMINER
10/25/03